Time Series Explorer: Bayesian Blocks with Generalized Profiles and in Higher Dimensions.

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Abstract

The Time Series Explorer (TSE) is a project aimed at provided new and advanced time series analysis algorithms in two forms: a tool kit and an automated pipeline applying selected tools in machine learning settings. I will present a sketch of TSE with emphasis on time-domain modeling in general and recent improvements of the Bayesian Block (BB) algorithm in particular. This includes generalizing the shape of the elementary blocks from the current constant-rate model to general shapes, such as two-sided exponentials. Related topics will include extension of BB to higher dimensions and a novel way to detect and characterize short time-scale bursts in time-tagged event data. The Fermi Gamma Ray Space Telescope light curve for the Crab Nebula will be used as an example for all of the algorithms discussed. This work is in collaboration with Tom Loredo.